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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/688,465	10/16/2000	Bernhard Schatzler	GR 97 P 1049 D	1415

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EXAMINER

PAREKH, NITIN

ART UNIT PAPER NUMBER

2811

DATE MAILED: 05/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/688,465

Applicant(s)

SCHATZLER ET AL.

Examiner

Nitin Parekh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 October 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 and 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lacap (US Pat. 5905299) in view of Inaba (US Pat. 4258381).

Regarding claim 1, Lacap discloses an electronic component comprising:

- a thin quad flat pack (TQFP 100 in Fig. 1)
- a housing made of a casting/plastic molding (104 in Fig. 1)
- a lead frame (102 in Fig. 1) having an island/die pad with a continuous/unpatterned base area (110 in Fig. 1) supporting an integrated circuit (IC)/die (106 in Fig. 1)
- the IC/die being bonded using an epoxy (108 in Fig. 1) to the island/die pad, the base area of the IC being smaller than that of the island/die pad, and

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- the IC/die and the island/die pad being embedded in the housing so that a thickness of the housing region above the IC is substantially equal to that below the island (see Fig. 1)

(Fig. 1; Col. 2, lines 20-31).

Lacap further shows relative length/horizontal dimensions of the IC/die and the island/die pad in Fig. 1 being such that the dimension ratio is around 0.9 (as measured from the relative linear dimensions in Fig. 1).

Lacap fails to specify the ratio between the base area of the IC and that of the island being 0.7- 0.9 for avoiding the flexure of the housing.

Inaba teaches using a lead frame package comprising an IC and an island, the island having a square shape (Fig. 1; Col. 4) and using a range of island dimensions to support various chip sizes (Col. 2, line 55). Inaba further teaches selecting the dimensions of the island depending on the size of the IC and selecting the respective area ratio to improve the bonding between the IC and the island and to achieve better heat dissipation/reduced heat stress (Col. 2, line 55; Col. 5, line 1-25) including an area ratio between the IC and the island being around 0.973 (Fig. 4; Col. 4, line 45-58; also see remarks on page 4 in applicant's response in paper #8).

Furthermore, the determination/selection of the parameters such as the dimensions of the IC chip and die pad/island including width, thickness, shape, area/area ratio, clearance of the die from an edge of the die pad/leads, etc. is a matter of routine optimization to achieve the desired support/rigidity and reduced level of heat stress and the corresponding thermal and encapsulation defects such as a warpage/flexure and cracking of the plastic molding/housing.

It would have been obvious to a person of ordinary skill in the art at the time invention was made to arrive at a ratio between the base area of the IC and that of the island of 0.7- 0.9 for avoiding the flexure of the housing as taught by Inaba so that the mechanical strength/rigidity of the island/die support structure and heat dissipation for the TQFP can be improved in Lacap's electronic component.

Regarding claim 3, Lacap teaches the island/die pad (110 in Fig. 1) being a continuous and unpatterned area (Col. 2, lines 20-31).

Regarding claim 4, Lacap fails to teach leads being routed to the island.

Inaba teaches using the lead frame packages having the leads being routed to the island/die pad (2'/1 and 7'/5 respectively in Fig. 1 and 4 respectively; Col. 2 and 3).

It would have been obvious to a person of ordinary skill in the art at the time invention was made to incorporate the leads being routed to the island as taught by

Inaba so that the mechanical strength and rigidity of the island can be improved Lacap's electronic component.

Regarding claim 5, Lacap teaches the lead frame including the leads being vertically centered within the housing and the island/die pad being vertically lowered with respect to the leads (see 102 and 110 respectively in Fig. 1; Col. 2, lines 20-31).

3. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lacap (US Pat. 5905299) and Inaba (US Pat. 4258381) as applied to claim 1 and further in view of Lim et al (US Pat. 5773878).

Regarding claim 2, Lacap and Inaba teach substantially the entire claimed structure as applied to claim 1 above, except a hollow groove formed on the IC by an amount of an adhesive emerged from between the IC and the island.

Lim et al. teach an adhesive bonding (18 in Fig. 2) of the IC to the island (Col. 2, line 9) and a hollow groove shape/fillet being formed by emerged adhesive at the notch/groove/overhang portion of the island (see a corner/edge portion between 20 and 14 in Fig. 2).

It would have been obvious to a person of ordinary skill in the art at the time invention was made to incorporate the hollow groove being formed on the IC by the amount of an adhesive emerged from between the IC and the island as taught by Lim et

al so that the die bonding can be strengthened in Lacap and Inaba's electronic component.

Response to Arguments

4. Applicant's arguments with respect to claims 1-5 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nitin Parekh whose telephone number is 703-305-3410. The examiner can normally be reached on 09:00AM-05:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722, 703-308-7724 or 703-872-9318 (Right FAX) for regular communications; 703-872-9310 (Right FAX) for After Final communications and 703-872-9310 (Right FAX) for customer service.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-3431.

Nitin Parekh

NP
05-08-03

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